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WHAT IS CLAIMED IS:

1 1. A method for communicating at least two source signals
2 from a first location toward a second location, the method
3 comprising:

- 4 a) generating a local oscillator signal for each of
5 the at least two source signals;
6 b) selecting signals from among the at least two
7 source signals to define selected source signals;
8 c) separately mixing each of the selected source
9 signals with a corresponding local oscillator signal
10 to generate mixed selected signals;
11 d) combining the mixed selected signals to generate a
12 transmission signal; and
13 e) transmitting the transmission signal towards the
14 second location.

1 2. The method of claim 1 further comprising:

- 2 - converting the transmission signal to an optical
3 signal before transmitting the transmission signal
4 towards the second location.

1 3. The method of claim 1 wherein the act of generating a
2 local oscillator signal for each of the at least two source
3 signals includes:

- 4 i) accepting a pilot carrier;
5 ii) generating a first local oscillator signal
6 based on the pilot carrier; and

7 iii) generating an n^{th} local oscillator signal by
8 dividing the first local oscillator signal by
9 2^{n-1} .

1 4. The method of claim 3 wherein the pilot carrier has a
2 frequency of approximately 120 MHz.

1 5. The method of claim 3 wherein the act of generating a
2 first local oscillator signal based on the pilot carrier is
3 performed by dividing the pilot carrier by a selected one
4 of two and three.

1 6. The method of claim 3 wherein each of the local
2 oscillator signals has a square waveform.

1 7. The method of claim 3 wherein the n^{th} local oscillator
2 signal has less noise than the $(n-1)^{\text{th}}$ local oscillator
3 signal.

1 8. The method of claim 3 wherein the one of the at least
2 two source signals associated with the n^{th} local oscillator
3 signal requires less bandwidth than the one of the at least
4 two source signals associated with the $(n-1)^{\text{th}}$ local
5 oscillator signal.

1 9. A method for communicating at least two source signals
2 from a first location to a second location, the method
3 comprising:

- 4 a) generating a source local oscillator signal for
5 each of the at least two source signals;
- 6 b) selecting signals from among the at least two
7 source signals to define selected source signals;

8 c) separately mixing each of the selected source
9 signals with a corresponding source local oscillator
10 signal to generate mixed selected signals;
11 d) combining the mixed selected signals to generate a
12 transmission signal;
13 e) transmitting the transmission signal to the second
14 location;
15 f) receiving the transmitted transmission signal at
16 the second location;
17 g) splitting the received transmission signal to
18 generate mixed selected signals;
19 h) generating a destination local oscillator signal
20 for each of the at least two source signals;
21 i) separately demodulating each of the mixed selected
22 signals using corresponding ones of the destination
23 local oscillator signals, to generate the selected
24 source signals.

1 10. The method of claim 9 further comprising:
2 - converting the transmission signal to an optical
3 signal before transmitting the transmission signal
4 towards the second location; and
5 - converting the received transmission signal to an
6 electrical signal before splitting it.

1 11. The method of claim 9 wherein the act of generating a
2 source local oscillator signal for each of the at least two
3 source signals includes:
4 i) accepting a pilot carrier;
5 ii) generating a first source local oscillator
6 signal based on the pilot carrier; and

7 iii) generating an n^{th} source local oscillator
8 signal by dividing the first source local
9 oscillator signal by 2^{n-1} ,

10 and wherein the act of generating a destination local
11 oscillator signal for each of the at least two source
12 signals includes:

13 i) accepting the pilot carrier;
14 ii) generating a first destination local
15 oscillator signal based on the pilot carrier; and
16 iii) generating an n^{th} destination local
17 oscillator signal by dividing the first
18 destination local oscillator signal by
19 2^{n-1} .

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1 12. The method of claim 11 wherein the pilot carrier has a
2 frequency of approximately 120 MHz.

1 13. The method of claim 9 wherein the source and
2 destination local oscillator signals are coherent.

1 14. A method for receiving at least two source signals,
2 transmitted from a first location, by a second location,
3 the method comprising:

4 a) receiving a transmitted signal at the second
5 location;
6 b) splitting the received signal to generate mixed
7 selected signals;
8 c) generating a local oscillator signal for each of
9 the at least two source signals; and
10 d) separately demodulating each of the mixed selected
11 signals using corresponding ones of the second local

12 oscillator signals, to generate the selected source
13 signals.

1 15. The method of claim 14 further comprising:
2 - converting the received transmitted signal to an
3 electrical signal before it is split.

1 16. The method of claim 14 wherein the act of generating a
2 local oscillator signal for each of the at least two source
3 signals includes:

4 i) accepting a pilot carrier;
5 ii) generating a first local oscillator signal
6 based on the pilot carrier; and
7 iii) generating an n^{th} local oscillator signal by
8 dividing the first local oscillator signal by
9 2^{n-1} .

1 17. The method of claim 16 wherein the pilot carrier has a
2 frequency of approximately 120 MHz.

1 18. The method of claim 16 wherein the act of generating a
2 first local oscillator signal based on the pilot carrier is
3 performed by dividing the pilot carrier by a selected one
4 of two and three.

1 19. The method of claim 16 wherein the each of the local
2 oscillator signals has a square waveform.

1 20. The method of claim 16 wherein the n^{th} local oscillator
2 signal has less noise than the $(n-1)^{\text{th}}$ local oscillator
3 signal.

1 21. The method of claim 16 wherein the one of the at least
2 two source signals associated with the n^{th} local oscillator
3 signal requires less bandwidth than the one of the at least
4 two source signals associated with the $(n-1)^{\text{th}}$ local
5 oscillator signal.

1 ~~22.~~ A transmitter for transmitting selected ones of at
2 least two source signals, the transmitter comprising:
3 a) an n-stage ripple counter for generating a local
4 oscillator signal for each of the at least two source
5 signals;
6 b) a selector for selecting signals from among the at
7 least two source signals to define selected source
8 signals;
9 c) a plurality of mixers, the plurality of mixers
10 i) having a first set of inputs coupled with the
11 selector for accepting the selected source
12 signals,
13 ii) having a second set of inputs coupled with
14 the n-stage ripple counter for accepting the
15 local oscillator signals,
16 iii) being adapted to separately mix each of the
17 selected source signals with a corresponding one
18 of the local oscillator signals to generate mixed
19 selected signals, and
20 iv) having a set of outputs for providing the
21 mixed selected signals; and
22 d) an n-way combiner, the n-way combiner having a set
23 of inputs coupled with the set of outputs of the
24 mixer, and being adapted to combine the mixed selected
25 signals to generate a transmission signal.

1 23. The transmitter of claim 22 further comprising:
2 e) an electrical to optical converter, coupled with
3 the n-way combiner and being adapted to convert the
4 transmission signal to an optical signal.

1 24. The transmitter of claim 22 wherein the ripple
2 counter:

3 i) generates a first local oscillator signal
4 based on a pilot carrier; and
5 ii) generates an n^{th} local oscillator signal by
6 dividing the first local oscillator signal by
7 2^{n-1} .

1 25. The transmitter of claim 24 wherein the pilot carrier
2 has a frequency of approximately 120 MHz.

1 26. The transmitter of claim 24 wherein the ripple counter
2 generates the n^{th} local oscillator signal with less noise
3 than the $(n-1)^{\text{th}}$ local oscillator signal.

1 27. The transmitter of claim 24 wherein the one of the at
2 least two source signals associated with the n^{th} local
3 oscillator signal requires less bandwidth than the one of
4 the at least two source signals associated with the $(n-1)^{\text{th}}$
5 local oscillator signal.

1 28. A receiver for receiving at least two source signals,
2 transmitted from a first location, the receiver comprising:

3 a) an n-way splitter, the n-way splitter
4 i) having an input for accepting a signal,
5 ii) being adapted to split the received signal
6 to generate mixed selected signals, and

7 iii) having a set of outputs for providing the
8 mixed selected signals;
9 b) an n-stage ripple counter, the n-stage ripple
10 counter
11 i) adapted to generate a local oscillator signal
12 for each of the at least two source signals, and
13 ii) having a set of outputs for providing the
14 local oscillator signals; and
15 d) a plurality of mixers, the plurality of mixers
16 i) having a first set of inputs coupled with the
17 set of outputs of the n-way splitter,
18 ii) having a second set of inputs coupled with
19 the set of outputs of the n-stage ripple counter,
20 and
21 iii) adapted to separately demodulate each of
22 the mixed selected signals at its first second of
23 inputs using corresponding ones of the second
24 local oscillator signals at its second set of
25 inputs, to generate the selected source signals.

1 29. The receiver of claim 28 wherein the n-stage ripple
2 counter is adapted to:

3 i) generate a first local oscillator signal
4 based on a pilot carrier; and
5 ii) generate an n^{th} local oscillator signal by
6 dividing the first local oscillator signal by
7 2^{n-1} .

1 30. The receiver of claim 29 wherein the pilot carrier has
2 a frequency of approximately 120 MHz.

1 31. The receiver of claim 29 wherein the each of the local
2 oscillator signals generated by the n-stage ripple counter
3 has a square waveform.

1 32. The receiver of claim 29 wherein n-stage ripple
2 counter generates the nth local oscillator signal with less
3 noise than the (n-1)th local oscillator signal.

1 33. The receiver of claim 29 wherein the one of the at
2 least two source signals associated with the nth local
3 oscillator signal requires less bandwidth than the one of
4 the at least two source signals associated with the (n-1)th
5 local oscillator signal.

1 34. A method for communicating at least two downstream
2 signals from a first location to a second location and for
3 communicating at least two upstream signals from the second
4 location to the first location, the method comprising:

5 a) generating a downstream source local oscillator
6 signal for each of the at least two downstream
7 signals;

8 b) selecting signals from among the at least two
9 downstream signals to define selected downstream
10 signals;

11 c) separately mixing each of the selected downstream
12 signals with a corresponding downstream source local
13 oscillator signal to generate mixed selected
14 downstream signals;

15 d) combining the mixed selected downstream signals to
16 generate a downstream transmission signal;

17 e) transmitting the downstream transmission signal to
18 the second location;

19 f) receiving the transmitted downstream transmission
20 signal at the second location;
21 g) splitting the received downstream transmission
22 signal to generate mixed selected downstream signals;
23 h) generating a downstream destination local
24 oscillator signal for each of the at least two
25 downstream signals;
26 i) separately demodulating each of the mixed selected
27 downstream signals using corresponding ones of the
28 downstream destination local oscillator signals, to
29 generate the selected downstream signals;
30 j) generating an upstream source local oscillator
31 signal for each of the at least two upstream signals;
32 k) separately mixing each of the upstream signals
33 with a corresponding source upstream local oscillator
34 signal to generate mixed upstream signals;
35 l) combining the mixed upstream signals to generate
36 an upstream transmission signal;
37 m) transmitting the upstream transmission signal to
38 the first location;
39 n) receiving the transmitted upstream transmission
40 signal at the first location;
41 o) splitting the received upstream transmission
42 signal to generate mixed upstream signals;
43 p) generating a upstream destination local oscillator
44 signal for each of the at least two upstream signals;
45 and
46 q) separately demodulating each of the mixed upstream
47 signals using corresponding ones of the upstream
48 destination local oscillator signals, to generate the
49 upstream signals.

1 35. The method of claim 34 further comprising:
2 - converting the downstream transmission signal to a
3 first optical signal before transmitting the
4 transmission signal towards the second location; and
5 - converting the upstream transmission signal to a
6 second optical signal before transmitting the
7 transmission signal towards the first location,
8 wherein the first and second optical signals have
9 different wavelengths.

1 36. The method of claim 34 wherein the act of generating a
2 downstream source local oscillator signal for each of the
3 at least two downstream signals includes:

- 4 i) accepting a pilot carrier;
- 5 ii) generating a first downstream source local
- 6 oscillator signal by dividing the pilot carrier
- 7 by a first number; and
- 8 iii) generating an n^{th} downstream source local
- 9 oscillator signal by dividing the first
- 10 downstream source local oscillator signal by 2^{n-1} ,

11 wherein the act of generating a downstream destination
12 local oscillator signal for each of the at least two source
13 signals includes:

- 14 i) accepting the pilot carrier;
- 15 ii) generating a first downstream destination
- 16 local oscillator signal by dividing the pilot
- 17 carrier by the first number; and
- 18 iii) generating an n^{th} downstream destination
- 19 local oscillator signal by dividing the first
- 20 downstream destination local oscillator signal by
- 21 2^{n-1} ,

22 wherein the act of generating an upstream source local
23 oscillator signal for each of the at least two upstream
24 signals includes:

- 25 i) accepting the pilot carrier;
- 26 ii) generating a first upstream source local
27 oscillator signal by dividing the pilot carrier
28 by a second number, the second number being
29 different from the first number; and
- 30 iii) generating an n^{th} upstream source local
31 oscillator signal by dividing the first upstream
32 source local oscillator signal by 2^{n-1} , and

33 wherein the act of generating an upstream destination
34 local oscillator signal for each of the at least two
35 upstream signals includes:

- 36 i) accepting the pilot carrier;
- 37 ii) generating a first upstream destination
38 local oscillator signal by dividing the pilot
39 carrier by the second number; and
- 40 iii) generating an n^{th} upstream destination local
41 oscillator signal by dividing the first upstream
42 destination local oscillator signal by
43 2^{n-1} .

1 37. The method of claim 36 wherein the pilot carrier has a
2 frequency of approximately 120 MHz.